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Drawing Together: Convergent practises in architectural education

Interwoven curriculum design for first year learning

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Abstract:

The diverse range of pre-existing skills and knowledge that students bring to the first year of an architecture program is a challenge to pedagogical design. The traditional model for first year teaching at the University of Queensland was a series of short, stimulating projects and assignments offering an introductory smorgasbord of concepts, skills and techniques across a broad range of architectural issues. In 2004 a more integrated curriculum model was trialled that retained a breadth of skills and concepts, but sought to encourage a deeper engagement with the integrative design act by weaving project-work through developmental iterations across three different courses. The curriculum model sought to create conceptual linkages between design, theory, technology and communication courses in a manner that facilitated genuinely rich and reflective learning. The model adopted was not a singular, monolithically integrated project, but the sequenced weaving of students' earlier design projects through successive modes of enquiry in three discrete courses, encouraging conceptual connection between the different sub-disciplinary paradigms. The inter-related curriculum required careful sequencing of project work across the year and clearly differentiated assessment criteria.

Peter Skinner devised and taught the interrelated courses in 2004, and Clair Hughes evaluated the student experience through survey and focus group analysis in 2005. The evaluation probed five key learning objectives of the interwoven curriculum:
• acquisition of broad and diverse skills, knowledge and understanding;
• authentic engagement with, and ownership of, the processes of design;
• participation in genuinely deep, rich and reflective modes of thinking and learning;
• identification with the processes and values of the architectural profession; and
• satisfaction from authentic accomplishment within the first year experience.
Positive student response encourages the consideration of further development of this strategy of interwoven curricula in architectural education.

Interwoven curriculum design for first year learning

The interwoven first year curriculum

This paper, in two parts, aims to present a first year architecture curriculum design evolved during the planning, coordination and teaching of three first year courses at the University of Queensland by Peter Skinner in 2004, and a subsequent evaluation of student response to the program by Clair Hughes.

Enhancement of the first year learning experience is currently a high priority at the University of Queensland.[1] In Architecture, the curriculum model for the first year of the BArch was traditionally perceived as an introductory 'smorgasbord' of offerings; short exercises designed to introduce a rich range of architectural concerns and give a foretaste of future studies. A relatively light settling-in year implied 'serious' architectural studies began in second year, with complex design processes developed through intensive tutelage, and a commitment to core values of the discipline expected for the first time.

Exposure to a broad range of architectural issues and modes of thought in the first year is indeed essential to prepare students for the scope of later architectural studies, but this paper seeks to demonstrate that it is not necessary to limit engagement with complex architectural issues, or to limit the integrative ambition of first year courses to achieve this diversity. As competition for BArch entry increases, commencing students are increasingly able and increasingly committed to their studies. With rising fees, there is a concomitant student interest in the value and relevance of courses, and a need for early opportunities to evaluate and confirm, or question, their chosen program of study. With high student/staff ratios, a carefully conceived curriculum design is increasingly important as a means of maximising independent student learning, engagement and satisfaction within limited staff resources.

The first year curriculum is a chicken and egg conundrum regarding the sequencing of learning activities, made especially difficult by the wide range of skills and experience of students from increasingly diverse backgrounds. All students are high overall academic achievers, but come with quite varied experience of art, history, science, mathematics, graphics, or applied technology. The dilemma is how to start to teach architectural design while students are developing drawing skills, comprehension of design principles, and understanding of the making of buildings are made; and how to meaningfully teach the core skill of creative design synthesis.

Of necessity, all first-year courses must assume variable pre-existing knowledge and skills, and be carefully calibrated to support novice learning while providing sufficient challenge for more independent learning. Architectural education spans a wide range of intellectual paradigms from the sciences to the arts, and requires a diversity of teaching modes. At UQ, two sequential Design studios comprise 50% of the first year curriculum supported by first semester Principles (theory) course, a second semester

Technology (construction and structures) course, and two elective Communications offerings. The content, mode and assessment practices had generally been developed by individual course co-ordinators within an agreed but relatively loose curriculum structure.[2]

In 2004, as a result of staff shortages, the author undertook coordination of the first Design studio and second Communications course, in addition to his usual second semester Technology. This one-off teaching pattern enabled an opportunity to rethink the learning program in introductory Design from first principles, and to explore latent synergies with the second semester courses. An opportunity arose to coordinate drawing skill acquisition and key architectural history, theory, constructional and structural concepts in a timely sequence that could serve to enrich the central design studio work.

Design 1 comprised three projects. The Robinson Event, a three-week design for the staging of a wedding celebration in a rainforest setting on campus, incorporating a small deck, canopy, bench and rostrum. (Fig.1) References were to F.W. Robinson's UQ site strategy, the landscapes of William Robinson and the contraptions of W. Heath Robinson. Experimentation was encouraged, with designs developed and presented through scale models and observational sketching.

Fig.1 Briony McKauge, Katrina Torresan: The Robinson Event, ARCH1100, UQ, 2004. (photos: author)

The second three-week project was the design of a small gallery for the display of contemporary Dutch architecture on an inner-city riverside site. (Fig. 2) The pavilion was to celebrate the Schröder House and incorporate selected Rietveld chairs. The project focussed on spatial experience, de Stijl composition and the incorporation of site views. Design development was via physical models, and de Stijl precedents allowed abstract explorations of architectural space and an easy introduction to orthographic drawing.

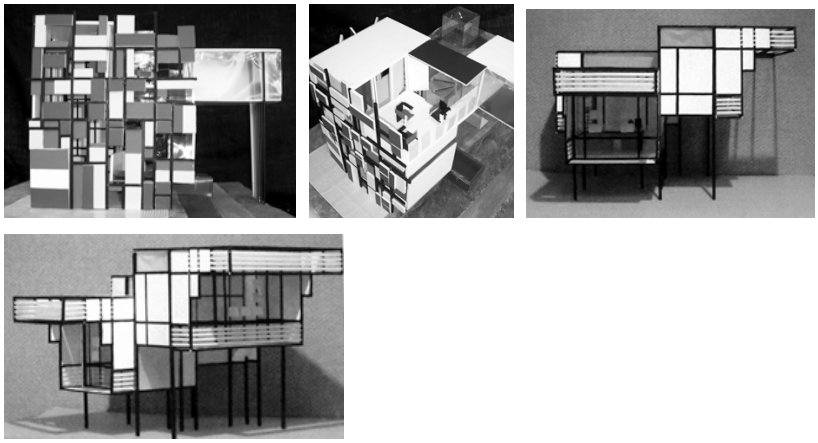

Fig 2. Kirsten Evans, Kirk McDonnell, New Holland Pavilion, ARCH1100, UQ, 2004. (photos: author)

The final project had a more complex program, for a small weekend dwelling incorporating studios for an artist and a painter in an idyllic 'bushland' setting. (Fig. 3) To reinforce and invite reflection on previous design conceptions, the fictional clients were introduced as the couple who wed in Project 1, and who had visited and were impressed by ideas from the student's second project. A 4300-word briefing document was rich in and functional and technical requests, and provided considerable insight into the 'clients' values and aspirations. The setting offered a wide choice of siting possibilities, and the pursuit of a synthesis of site and program considerations, led students through successive design iterations and refinements.

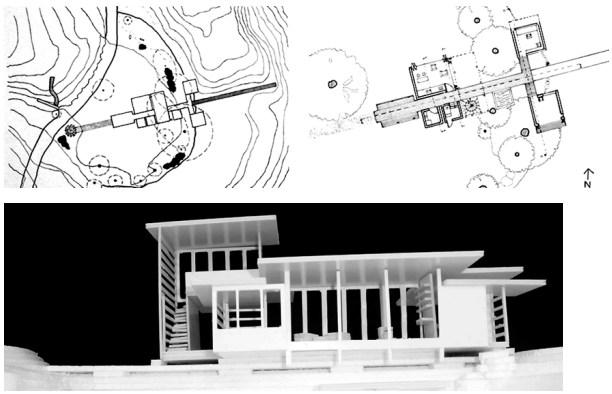

Fig3. Madeline Zahos, Jasmin Ong, Artists Retreat, ARCH1100, UQ, 2004.
(photos: author)

The revisiting of themes in the Artists' Retreat project provided students with opportunities to deepen and enrich earlier learning.[3] Beyond programmatic requirements, this project revisited issues of landscape response, ingenuity and wit from Project 1, and spatial experience, composition, sequence, and views from Project 2. Lectures expanded the modernist precepts initially discussed in relation to Rietveld to include exemplar works of Wright, Corbusier, Mies and Aalto, familiar from the parallel theory course. Topographic survey, solar geometry, environmental servicing and constructional considerations raised the precision of physical modelling and orthographic drawing depictions. Athough the three projects were self-

contained and independently assessed, the 'client' link to other projects provides an opportunity to reconsider previously explored concepts, and the interwoven themes encourage reflection, discussion and peer learning. Design project assessment addressed criteria of completeness, site analysis, brief analysis, conceptualisation, resolution and communication. A design diary (10%) served as a journal of the students' reflective design processes and developing drawing and conceptual skills. (Fig. 4)

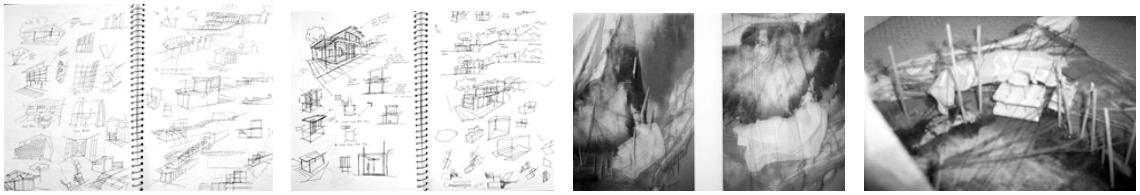

Fig 4. Ian Tsui, Patricia Davy, Design Diary, ARCH1100, UQ, 2004.
(photos: author)

The explicit model for the interwoven first year curriculum is the successive phasing of conceptual design, design development and documentation in architectural practice. The interwoven curriculum offers a foretaste of integrative design and underscores the centrality of 'the project' as the focus of intellectual endeavour. Exposure to the multi-modal thinking of the architect is implicit in this strategy, which privileges neither arts, science nor technology, but rewards an ability to bridge creative and instrumental domains[4] and to distinguish 'left-brain' from 'right-brain' processes.[5]

Exposing students to the 'signature pedagogy'[6] of the profession through project-work that explicitly models aspects of architectural practice is intended to assist students to envisage and identify with their future profession at the earliest opportunity and to strengthen engagement with their undergraduate education as a whole. Projects are presented as hypothetical client briefs with both pragmatic and poetic dimensions. As in practice, a period of brief and site analysis precedes schematic design. Research into architectural precedents is required, with supporting lectures and

The Technology assignment mirrors the architect's role in constructional design and documentation. In Technology, weekly lectures and tutorials focussed on designing and modelling the construction elements of roofing, roof structure, wall framing, floor framing, bracing, tie-down and sectional detailing for the students' Artists' Retreat dwellings. (Fig. 5) Assessment was quite independent of earlier success against design criteria, and required demonstration of construction principles and systems, application of relevant codes and technical information, and efficiency and elegance of the constructional resolution.

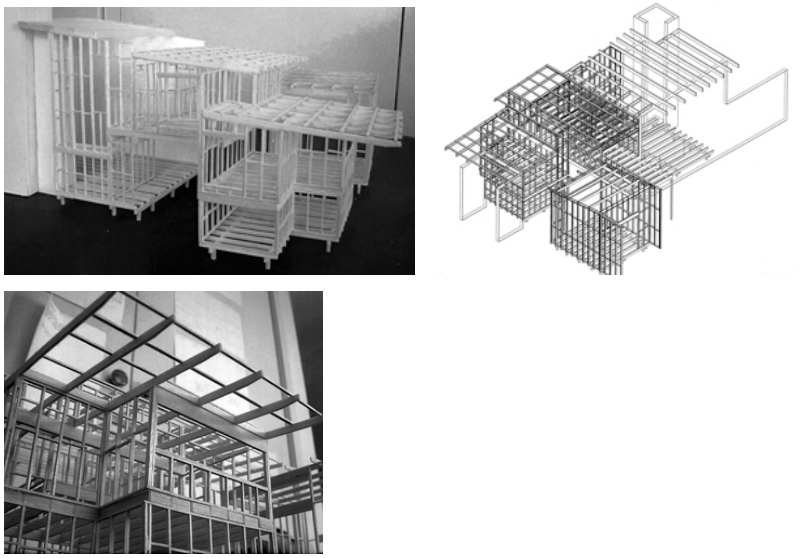

Fig 5. Joshua Spillane, Timber Construction Technology 1, ARCH1220, UQ 2004.
(photos: author)

The second semester Communications course builds professional skills of accurate and persuasive three-dimensional architectural communication. Assignments call for the preparation of a series of accurate and persuasive depictions of the Pavilion interiors and exterior views of the Artists' Retreat within their physical contexts. Assessment again disregards previously assessed design qualities and focuses on demonstrated skills at free drawing and sketching, drawing-board graphics, CAD modelling and rendering employing a range of digital and physical media.

Fig 6. Jim Hampson, Briony McKauge, Rick Hill, Communications, ARCH1260, UQ, 2004.
(photos: author)

Almost all beginning architecture students are entering a new field of learning. The studio setting provides a generally reassuring and supportive environment for cooperative learning, but high-achieving students are still highly motivated by personal accomplishment. In architecture, students' derive satisfaction from their own visible and tangible and project outcomes, with the affirmation of numerical grading often a lesser motivator. The medium of physical modelling enables commencing students to transcend variable

drawing skills and engage directly with the substantive issues of architectural design. Rough study models are excellent visual tools for instruction in architectural drawing techniques, and care invested in finished design models is immediately rewarding. Developing and refining projects through subsequent technology and communications cycles enables students to finish the year with at least two completed projects that they understand intimately, that can be regarded as potential buildings, and that have grown from the students' own initial conceptions. In formal assessment terms, this work is simply the product of a number of short and discrete exercises, but the interweaving can represent a sustained refinement of thinking over seven or eight months. At year's end there is a very tangible record of progression within the chosen course of study.

The interwoven curriculum model was developed and refined 'organically' over the teaching year, with little explicit prior theorisation. The author was buoyed by the readily apparent enthusiasm of students and the perception of an unexpectedly high overall quality of work. In 2004 the curriculum links resulted from a single co-ordinator for the three courses, but there appears no impediment, and possibly greater benefit, in a similar structure being implemented by team teaching.[7] In staff resource terms, the pedagogy was highly efficient, with perceived benefits arising from planning and coordination of assessment tasks rather than any increase in course content or tuition. Following very positive student feedback,[8] a modified version of the Design 1 course was taught again in 2005, with second semester Technology and Communications courses to be taught by others.

An independent appraisal of the 2004 student experience was undertaken to test the perception of educational benefit in five general areas. The focus of this study was to evaluate how successful the integrated curriculum was in:
(a) supporting attainment of a breadth of diverse skills, knowledge and understanding;
(b) facilitating authentic engagement with, and ownership of, the processes of design;
(c) stimulating genuinely deep, rich and sensitive modes of thinking and learning;
(d) fostering identification with the processes and values of the chosen profession; and
(e) delivering satisfaction through genuine accomplishment within the first year experience.

Evaluation

The paper's second author is a consultant from the university academic development unit,[9] who undertook an investigation of student opinion on the integrated curriculum design in order to complement or challenge the lecturer's own perspectives on the questions posed.

The collection of qualitative and quantitative data was undertaken through a mixed method evaluation[10] that incorporated: a customised survey administered towards the end of Semester 1 2005, and a focus group conducted shortly after the customised survey. The survey instrument required that students

indicate their agreement with statements about various aspects of the courses and teaching using a five-point Likert-scale and also offered opportunities for comment. Quantitative data were analysed using electronic scanning and statistical processing tools. Agreement levels quoted represent the total percentage of students who rated survey items in the 'Agree' and 'Strongly Agree' response categories, likewise disagreement percentages represent 'Disagree' and 'Strongly Disagree' responses. Qualitative data were scrutinised to identify themes related to the evaluation questions and comments used to illustrate appropriate findings.

(a) attainment of a breadth of diverse skills, knowledge & understanding

Before and after comparisons of the learning required to complete individual projects indicated that students perceived the projects had been effective in developing their skills. For example, while 8% felt they 'had the skills necessary for this (The Robinson Event) project *before* I undertook it', 76% felt they had 'developed the necessary skills, knowledge and understanding *by the end* of the project'. For Projects 2 and 3, the equivalent 'before and after' assessments of skills were 24 to 68%, and 36 to 72% respectively.

Learning benefited from the efficiencies of an integrated approach as revisiting familiar designs for construction or communication projects meant that students could focus quickly on the new concepts and skills. The 'in-depth knowledge of projects' gained through integration also facilitated the development of 'better understanding'. Students reported that they learned more about their earlier Pavilion (61%) and Artists' Retreat (83%) designs by revisiting them for the completion of later Communications projects. The timber construction component was reported as rewarding by 52% of the cohort with 8% in disagreement.

(b) authentic engagement with, and ownership of, the processes of design

The studio approach to learning was 'totally different from the standard uni courses' students had experienced previously in that it required consistent and intense pursuit of a 'line of inquiry throughout the semester'. The integrated approach engaged students in work they found interesting and challenging. Revisiting themes made the completion of later projects such as technical development of earlier designs more interesting for 64% of students. 8% felt their creativity was limited by revisiting earlier themes, and 20% believed that opportunities to undertake different projects would have enhanced their interest.

Though the pace of the design course was seen by some as 'crazy', and 20% found the pace and workload excessive, 72% of students found it enjoyably stimulating and 'would have found it boring if it hadn't challenged us so much'. Students reported high levels of enjoyment and motivation to do well because 'you put so much of yourself into your work' and 'really get to know your own designs'.

(c) genuinely deep, rich and sensitive modes of thinking and learning

Students felt that the study of architecture required different ways of thinking, and that once they realised that 'there isn't one right answer in architecture', they enjoyed 'coming up with a design, working on it, keeping ideas open and playing with it'. The use of common themes and ideas enabled each new project to develop initial ideas to much greater depth (84%) and 'when you did come back to a theme, your response was richer'.

(d) identification with the processes and values of their chosen future profession

In addition to the development of their knowledge and skills, students agreed that all projects they had undertaken in the previous year had, to some extent, 'been important steps in my architectural education' - The Robinson Event (52%), New Holland Pavilion (72%), The Artists' Retreat (96%) and the Timber Construction (92%).

The cyclic nature of the program which required 'staged' revisiting of specific designs for the purposes of additional skill development was likened to 'a slow replay of what an architect would do in practice'. Students saw the 'whole process coming together and a better understanding of what architecture entails'. They particularly appreciated the detail in the design briefs as helping them to progressively understand the need for responsiveness to client needs and getting them 'more into this whole world of architecture'.

(e) satisfaction through genuine accomplishment within the first year experience

For 83% of the students who took all three courses in the integrated suite, the opportunity to develop a design from initial conception to detailed depiction was deeply satisfying, and no respondents disagreed. Students felt that those who had not taken the elective Communication course missed out on seeing a detailed contextual representation of their design and speculated that this may have underpinned the decisions of some students who subsequently dropped out of the program. 61% of the students who took the Communications course supported a suggestion that it should be made compulsory for all students, with 16% registering disagreement. Of students who had *not* taken the Communications course as an elective, 33% supported it being made a compulsory course, while none expressed disagreement.

Conclusions

The evaluation found student opinion very strongly in support of the interwoven first-year curriculum. 75% of students recommended that the first and second semester BArch courses should continue to be interwoven in this way, 20% expressed neither agreement nor disagreement, and 5% disagreed. When asked whether this model should be recommended for other BArch courses, 67% agreed, 25% were neutral and 8% disagreed. Within a generally enthusiastic student response, the evaluation process also identified areas of suggested improvement, specifically with regard to the Technology assignment.

Students overwhelmingly reported that the interwoven courses had supported a depth of learning and engaged them in the characteristic ways of thinking of their future profession. Satisfaction was succinctly

expressed by one student as ‘a sense of accomplishment for me at the end – you’d designed a building you could almost imagine existing’.

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1. ‘Teaching and Learning Enhancement Plan: 2003-2007’, The University of Queensland, Brisbane, 2003 [unpublished].

2. At UQ, overview of the vertical sequencing of courses is undertaken by curriculum groups (design group, technology group, humanities group) comprising all staff teaching in these sub-disciplines and involves both pre- and post-semester reviews of teaching content. Horizontal coordination is undertaken by semester planning teams. Within this structure there is latitude for considerable individual innovation in project content.

3. Distinctions between deep and surface learning modes are articulated in John Biggs, *Teaching for quality learning at university: what the student does*. Philadelphia: SRHE & Open University Press, 2003; Michael Prosser & Keith Trigwell, *Understanding learning and teaching: the experience in higher education*, Buckingham: SRHE & Open University Press, 1999; and Paul Ramsden, *Learning to teach in higher education,* London; New York: Routledge Falmer, 2003.

4. Sam Ridgway examines the issue of integration, particularly with regard to design and technology in: Sam Ridgway, ‘Building a site for thinking: teaching first year building construction’, *Architectural Theory Review*, 5, 2, 2000: pp.14-26; and Sam Ridgway, ‘Construction knowledge and the design studio: the question of integration’, *Architectural Theory Review*, 8, 2, 2003: pp.152-163; and argues for the teaching of technology within a critical cultural framework.

5. A recommended text; Betty Edwards, *Drawing on the right side of the brain*, London: HarperCollins, 1993, proposes techniques to overcome analytical cerebral dominance in perceptual drawing.

6. Lee Shulman, ‘The Signature Pedagogies of the Professions of Law, Medicine, Engineering, and the Clergy: Potential Lessons for the Education of Teachers’, Teacher Education for Effective Teaching and Learning Workshop NRC Centre for Education Feb. 2005. http://hub.mspnet.org/index.cfm/11172 [Last accessed 15 September, 2005].

7. David Leatherbarrow describes a long-established structure at Penn State University, where all academics teaching parallel seminar or lecture courses co-teach in the design studio. Sam Ridgway & David Leatherbarrow, ‘On common ground’, *Architectural Theory Review*, 9,2, 2004, pp. 91-103.

8. Teaching Evaluations (TE) were undertaken for all three courses by The Teaching & Educational Development Institute, University of Queensland in 2004. Student overall satisfaction ratings on a five-point scale were: Architectural Design (ARCH1100) 4.35; Architectural Technology (ARCH1220) 4.47, Architectural Communications (ARCH1260) 4.64.

9. The Teaching & Educational Development Institute (TEDI), University of Queensland, 2004.

10. J.R. Burke & A.J. Onwuegbuzie. ‘Mixed methods research: a research paradigm whose time has come’. *Educational Researcher* 33, 7, 2004, pp. 27-31.